

CybraCom L.L.C.

Information Technologies

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CybraCom L.L.C.

Information Technologies

Discover unequalled expertise in technology, experience specific to your industry and clear navigation through the complexity of today's interactive business world. CybraCom IT Consulting Services provides you with the tools, experience and resources to develop targeted Information Technology initiatives that can improve productivity and systems management.

CybraCom is a professional internetworking services company, based in Phoenix, AZ and Albuquerque, NM, that audits, designs, implements and supports advanced communications networks to meet the demands of today's economic and business climate. We offer innovative solutions for complex communications needs, specializing in enterprise and public strategic partners. With our unparalleled local expertise in IP-based networking, including LAN, WAN and IP Multiservice (voice, video, data convergence) technologies, CybraCom can design or re-design a unified network infrastructure to enable voice, video and data communications within buildings, within campuses, across cities and around the globe. In addition to assessing, designing and implementing networks, CybraCom provides critical on-going support and services to ensure that the reliability, availability and security of our strategic partners' communications infrastructures are maintained for the long term.

CybraCom offers a wide range of business communications consulting services in the area of voice over IP (VoIP) communications, IP PBX migration, Microsoft Windows environments, Citrix application servers, hosted IP PBX services, disaster recovery planning, and next generation phone systems. IP telephony or VoIP is a very specialized form of data communication. CybraCom's extensive experience in IP telephony comes from working directly in the forefront of the industry. Our mission is to provide you an objective, independent, and professional perspective combined with one of a kind customer service and seamless integration.

Company Qualifications

CybraCom creates communications solutions for a wide range of public and private institutions including:

- Federal, state and local governments
- Educational institutions
- Hospital and healthcare networks
- Banks and financial institutions
- Large commercial enterprises

CybraCom has been involved in designing, building and/or servicing a majority of the public sector communication infrastructures in Arizona and New Mexico, including those of major counties, cities and educational institutions. The combination of technical expertise and experience with large-scale inter-networks makes CybraCom a valuable strategic partner in all stages of maintaining an effective and efficient infrastructure, from evaluation, consulting and design through implementation and ongoing support.

Technical Considerations

Due to the fact that IP telephony is an application, we must ensure that the network is suitable for this most critical application. A communications network forms the backbone of any successful organization. These networks transport a multitude of applications and data, including high-quality video and delay-sensitive data such as real-time voice. The bandwidth-intensive applications stretch network capabilities and resources, but also complement, add value, and enhance every business process. Networks must provide



secure, predictable, measurable, and sometimes guaranteed services. Achieving the required Quality of Service (QoS) by managing delay, delay variation (jitter), bandwidth, and packet loss parameters on a network becomes the secret to a successful end-to-end business solution. QoS is the set of techniques to manage network resources.

Migration Strategies

In today's age of converged networks, migrations require diligent up-front planning, assessment, documentation, and ongoing maintenance. Still, a significant percentage of network migration mishaps can be traced back to oversights that occur even before the migration starts.

I. Understand the Topology of Your Network

The first step in any migration is to establish a baseline audit of the network. Surprisingly, few companies maintain accurate, up-to-date infrastructure topology diagrams. A Layer 3 schematic hardly ever exists. A snapshot of existing network devices including servers should be absolutely mandatory before initiating any new architectures or technologies. Voice over IP (VoIP), for example, requires fast rerouting and high bandwidth, all of which may be limited by legacy systems and routers. The hardware survey should include location and connections in addition to the device specifications of software, configuration, bandwidth, CPU performance, buffer, and applications. Migrations require swapping out devices, changing the software on existing devices, or both.

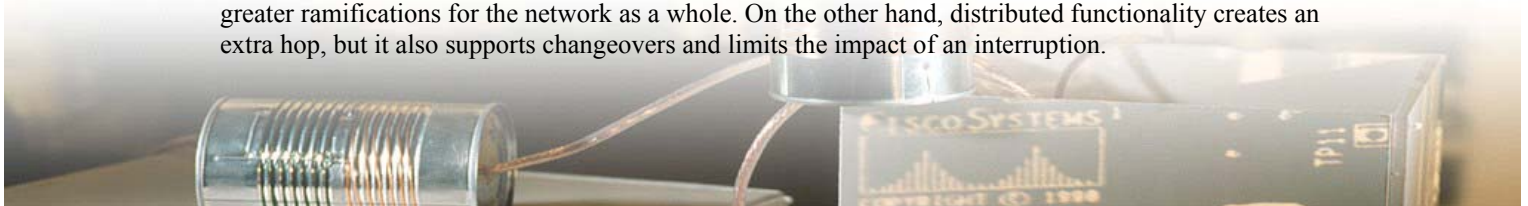
VoIP is also a migration that transpires at the node level. The bandwidth-sharing nature of IP is manageable via extra bandwidth or prioritization of voice traffic. This, in turn, requires a greater level of management and intimate knowledge of network topology down to the node level -- the sheer scale of which can seem insurmountable. Collecting information on hundreds, if not thousands, of devices must be completed quickly and almost always remotely. Knowing the physical location of every device in a large network can be equally difficult. While no magic bullet exists, there are tools and techniques that can help to navigate these tasks effectively.

II. Know Your Software

Many network migration problems start with software, either IOS or software applications, and generally fall into one of two buckets: compatibility or functionality. IOS compatibility between devices is essential. A hardware migration can often also mean an IOS migration. Ensure that the Cisco IOS Software Release on your network matches the release on your latest product shipment.

Equally important as confirming compatibility between devices is verifying interoperability of different vendor equipment. Certain releases of vendors IOS Software, particular configurations, or even bug fixes may affect interaction with another vendor's server. While the a baseline audit described in In addition, updates, patches, and bug fixes can introduce problems in the network. It is the nature of software that every bug fix has the potential to create new ones, which may lie dormant for some time. There are bugs, for instance, that cause systems to reboot and refer to incorrect instructions, creating an endless loop.

The strength of a network lies, to a great degree, in the software, and network optimization also requires changes in functionality selection. New feature enhancements such as security, virus protection, load balancing, data switching advances, network performance management, and so on may be available only with a particular vendor IOS Release or image update. "Functionality deployment" (telling the device which functions to perform) is also important. For example, in a storage network architecture migration, functionality in a data center can be resident in a single router or deployed (distributed). On one hand, too much functionality in one router can lead to an unplanned outage with greater ramifications for the network as a whole. On the other hand, distributed functionality creates an extra hop, but it also supports changeovers and limits the impact of an interruption.



Software applications drive additional hardware and IOS migrations too. A VoIP migration, for example, may require new routers that can support voice. Special IP configuration steps are needed in an ATM environment given possible conflicts between the demand for shortest hop and lack of transparency in ATM switching.

III. Use Time to Avoid Downtime

Time can be the meanest dog in the yard, and you need to be hyper-diligent to avoid getting bit. It's critical that you have a clear, comprehensive deployment roadmap with a timeline and site sequence for rollout -- all the way down to pulling cable and initiating the switchover. The biggest delays come from easily identified critical paths, and established backup plans can quickly save the day. Save time by ensuring that the equipment is staged and provisioned before it ships, a step that costs extra but is well worth the additional funds.

Time can also be used to manage the costs of using third-party vendors. For example, where reasonable, contracts should start from date of shipment or, better still, deployment. Also, time your switchover carefully, ideally at night or on weekends when data traffic is lowest and the impact on end users will be minimized.

IV. Choose "Outside In" or "Inside Out"

There are certain advantages to starting with a single, remote site. A remote site allows network engineers to take the deployment a step beyond the lab but without the exposure of a full-blown production environment. The isolated site enables a window into potential problems within a contained setting, limits their impact, and helps to bulletproof the design before rollout to the rest of the network.

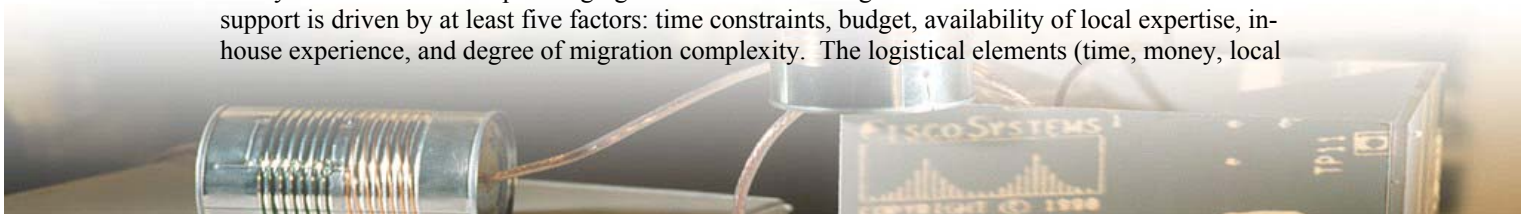
An additional advantage is that, with certain technologies, deploying from the edge of the network to the core (*outside in*) is a more cost effective approach. For example, central offices or points of presence can be built up on an as-needed basis. The outside-in approach is best suited for changes specifically targeted at the end-user level, such as VoIP where phones need to be installed. Software changes such as new applications or protocols are easier to implement from the network edge because you can gain greater familiarity and comfort with the new technology, especially at the node level, where changes can be especially noticeable. A swap to a different device at the core, for instance, may translate to slower access at the edge. Focusing on the edge and working in allows you to negotiate the impacts before they become networkwide.

Alternatively, working from the core to the edge (*inside out*) is the preferred approach when it comes to hardware changes, such as boosting bandwidth capacity. Some of the advantages of the inside-out approach are:

- Fewer devices sit at the core than at the edge where there are multiple nodes and users. Nodes tend to be easier to manage, usually following cookie-cutter configurations with less frequent software/feature changes.
- Redundancy at the core minimizes the impact of problems, whereas at the edge, users immediately spot node failures.
- Networking staff is generally concentrated at corporate headquarters, where the core is. After backbone issues are resolved, changes can begin with edge devices at particular sites including workstations and PCs. Working from the inside out is also flexible to need: It fits an aggressive all-or-nothing migration as well as a moderate, one-piece-at-a-time approach.

V. Assess Internal and External Expertise

Will you need external help managing an active network migration? The decision to use outside support is driven by at least five factors: time constraints, budget, availability of local expertise, in-house experience, and degree of migration complexity. The logistical elements (time, money, local



talent) are the most straightforward to address, but things are not so easy when it comes to gauging whether the necessary expertise and skills exist internally.

Some companies base their outsourcing decisions on the concept "better safe than sorry" when a more appropriate motto should be "the right tool for the job." Increasingly, it's not a matter of whether or not to outsource but to what degree should external experts be involved. On a consultative basis (design review, verification, and validation)? Or more active engagement (from complete deployment management to on-call engineering support during implementation)?

VI. Manage, Manage, Manage Your Migration

After you've conducted a baseline audit of your network and gap analysis (hardware and software), diagrammed a deployment timeline, and have the appropriate internal and external experts standing by, the rest of your migration checklist should include:

- **Network verification and validation.** There should be a predeployment lab test before rollout to the production environment. Cold booting or turning off the devices in a replicated environment is not verification. The migration needs to be simulated and tested in a real-world setting with data flowing and changes introduced. Applications that will run on the network need to be included and performance tested.
- **Bug surfing.** Maintains a database of bugs to call out problems and enable protocol integration. A rigorous review of the database bugs must be conducted. Transitioning the network. Parallel networks may be required for some time to eliminate service interruptions and manage unexpected problems.
- **Post-integration support.** Processes need to be established for managing the post-integration stage. Business users need to communicate issues such as application or node downtime. Operations needs to communicate with engineers in the event of failed migrations. Change management requires training, documentation, and new levels of support.

Project Communications

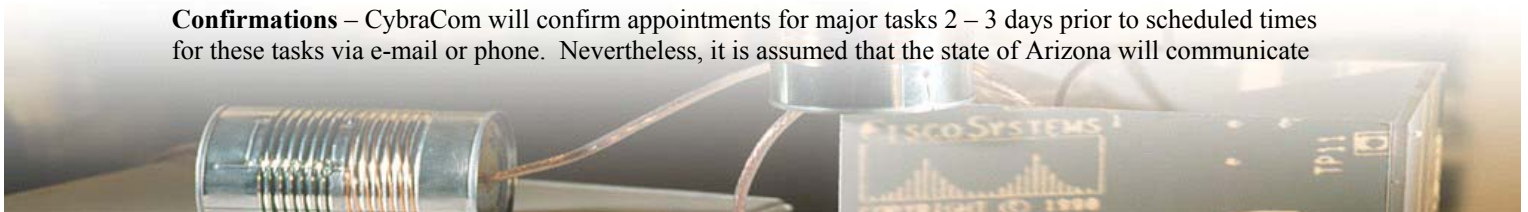
Communications about project status amongst all project team members and stakeholders is critical to a successful completion. CybraCom will commit to the following schedule to ensure an appropriate level of communications.

Kickoff - Upon project initiation, a kickoff meeting will be held with all project team members and stakeholders. The purpose of this meeting will be to review the project scope of work, schedule, tasks and responsibilities.

Status Updates – CybraCom will broadcast e-mail status updates to all project team members and stakeholders upon completion of major tasks or milestones as well as weekly updates.

Project Meetings – A schedule for project update meetings will be determined during the kickoff meeting. The purpose of the update meetings will be to review completed tasks as well as to review plans for upcoming scheduled events. This meeting will also serve as a forum to review changes to scope, updates on issues, scheduling changes and other changes to the project plan.

Confirmations – CybraCom will confirm appointments for major tasks 2 – 3 days prior to scheduled times for these tasks via e-mail or phone. Nevertheless, it is assumed that the state of Arizona will communicate



any scheduling changes with the CybraCom, L.L.C. Account Manager or Project Lead at least 1 day prior to any scheduled events.

Sign-off – Upon completion of the project, a sign-off meeting will be held with all project team members and stakeholders. The status of any outstanding issues will be reviewed along with plans to address closure of these issues. A “plus/delta” review will be performed to identify what went well with the project as well as what could have been done better. The project sponsor will sign the project signoff sheet to indicate successful completion of the project.

Project Deliverables

The following deliverables will be provided upon completion of this project:

- Project Summary
- Technical Overview
- Topology Maps
- Configuration Documentation (how to information)
- Contract and/or Purchasing Information
- Ongoing Support Information
- Contact List
- Sign off Sheet

CybraCom, L.L.C. is a minority women owned company based out of Phoenix Arizona, and operating in the greater Southwest of the United States. We strive to provide the best customer service one may find, and combine that with seamless integration and expert solutions. As a team, we strive to provide predictable performance as well as a comfortable user experience – with a lower total cost of ownership. Applications, devices, operating systems, and connections are diverse, and computing environments are complex. By leveraging in-depth product knowledge and real-world experience, our professionals successfully deliver complex solutions with less risk and effort for a faster time-to-market.

